REMARKS

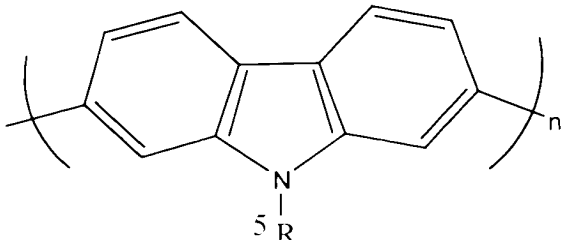
Claim 1 has been amended to more precisely define applicants' invention. Support for this amendment may be found, for example, at page 2, lines 1-2 of the specification and in the disclosure of the Examples 1-12 of compounds having R groups containing from 7 to 18 carbon atoms. Claims 2 and 5 have been amended to correct typographical errors. The amendments merely further define the claimed subject matter and are not believed to raise any issue of new matter.

35 U.S.C. §102(b) Rejection

In the Office Action mailed on March 18, 2003, the Examiner rejected claims 1-4 under 35 U.S.C. §102(b) as being anticipated by Chem Abstracts 126:212647, 119:250891, 119:181323, 114:31798 or 111:40172. The Examiner has taken the position that the abstracts disclose the conjugated poly(N-alkyl-2,7-carbazole) of the claimed formula. Applicants respectfully traverse this rejection.

A claim is anticipated under 35 U.S.C. §102(b) only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the patent claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

As amended, claim1 is directed to a conjugated poly(N-alkyl-2,7-carbazole) of the formula (I)



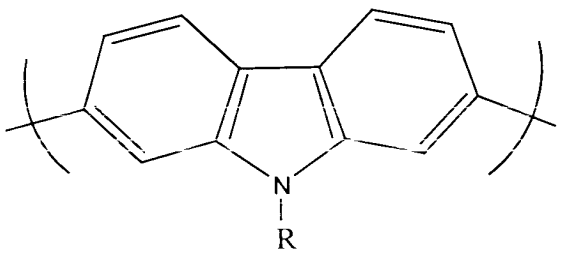
(I)

wherein R represents a linear or branched alkyl group having 1- 22 carbon atoms and n is an integer of about 3 to about 100, and when R is a decyl radical, n is not an integer of from 3 to 6.

The complete text of the article (Geissler) of abstract 126:212647 is enclosed for the Examiner's convenience. Neither the abstract nor the article anticipates claim 1, as amended, because neither teaches the claimed conjugated poly(N-alkyl-2,7-carbazole) of the formula (I). In Figure 1 of the Geissler et al. article, a general scheme of synthesis of soluble poly(1-decylpyrrole) and poly(9-decylcarbazole)s is disclosed. The carbazole oligomers disclosed in the Geissler et al. article are specifically excluded from the scope of pending claim 1, as amended. Accordingly, claim 1 is not anticipated by the cited abstract.

Rejected claim 2 depends from claim 1 and thus contains all the elements set forth in claim 1. For the reasons set forth above with respect to claim 1, claim 2 is not anticipated by the cited abstract CA 126:212647. The Examiner's rejection of claims 1 and 2 on this basis is improper and applicants respectfully request the Examiner to withdraw the rejection.

Claims 3 and 4 relate to a conjugated polymer comprising <u>alternating</u> units of the formula (I')



(I')

In contrast, the Geissler et al. article discloses homo-oligomers, not a polymer comprising alternating units of the formula (I') as presently claimed. Accordingly, claims 3 and 4 are not anticipated by the cited abstract.

The Examiner has cited Chemical Abstract Nos. CA 119:250891, CA 119:181323, CA 114:31798 and CA 111:40172 as anticipating claims 1-4.

CA 119:250891 discloses thermal transitions in poly(N-alkyl-3,6-carbazolylenes).

CA 119:181323 discloses an investigation of the electrocatalyzed step polymerizaiton of soluble electroactive poly(N-alkyl-3,6-carbazolylenes).

CA 114:31798 discloses the chain length effect on the electroactivity of poly(N-alkyl-3,6-carbazolediyl) thin films.

CA 111:40172 discloses polymers of carbazole derivatives.

Chemical Abstract Nos. CA 119:250891, CA 199:181323, CA 114:31798 and CA 111:40172 cited by the Examiner, do not anticipate claims 1-4 because they do not disclose conjugated polycarbazoles comprising monomeric units linked at positions 2 and 7, as presently claimed (see chemical name in claim 1, poly (N-alky-2,7-carbazole)), but rather disclose polymers comprising monomeric units that are linked at positions 3 and 6. Thus, the Examiner's rejection of claims 1-4 on this basis is improper and the Examiner is requested to withdraw the rejection.

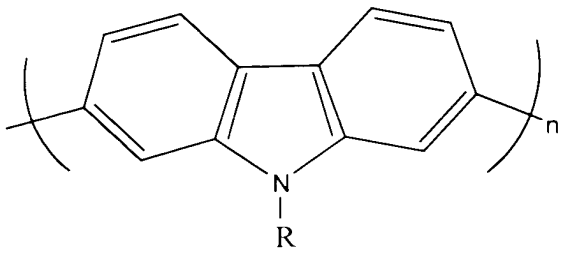
35 U.S.C.§103(a) Rejection

The Examiner has rejected claims 5-6 under 35 U.S.C.§103(a) on the basis that Chem Abstract 131:88268 discloses the synthesis of a conjugated polycarbazole derived from 9H-carbazole-3,6-dicarbonyl dichloride, that Chem Abstract 119:181323 discloses the

polymerization of 3,6-dibromo-N-alkylcarbazole using Ni catalytic species, that Chem Abstract 114:31798 discloses the use of a catalytic Ni based system to form poly(N-alkyl-3,6-carbazolediyl) thin film, and that Chem Abstract 111:40172 discloses polymers of carbazole derivatives using a 3,6-dibromocarbazole. The Examiner maintains that the disclosures of the references differ from the instant claims in that they do not disclose the claimed carbazole of formula (II) with so many variations. The Examiner urges that the references disclose specific carbazole reactants under the same or similar conditions to form the same or similar products. The Examiner maintains that it would have been obvious to one of ordinary skill in the art to select the reactants under process conditions to get the claimed product of the claimed formula, since they have been shown to be effective in a similar system and thus would have been expected to provide adequate results. The Examiner further urges that there is no showing of unexpected results derived from the selections. Applicants respectfully traverse this rejection.

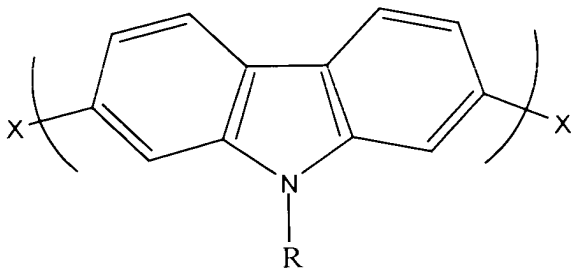
To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. There must also be a reasonable expectation of success and the prior art reference must teach or suggest all the claim limitations. Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 5 is directed to a process for preparing a conjugated poly(N-alkyl-2,7-carbazole) of formula (I):



(I)

wherein R represents a linear or branched alkyl group having 1 to 22 carbon atoms and n is an integer of about 3 to about 100, which comprises treating a N-alkyl-2,7-difunctionalized carbazole of the formula (II):



(II)

wherein R is as defined above and X represents a trifluoromethanesulfonyl group or a halogen atom selected from the group consisting of bromine, chlorine and iodine atoms, with triphenylphosphine and 2,2'-bipyridine in the presence of zinc and nickel chloride, to cause polymerization of the compound of formula (II).

Claim 5 is not rendered obvious by any of the Chem. Abstracts cited by the Examiner because none of the abstracts teaches or suggests the process for preparing a conjugated poly(N-alkyl-2,7-carbazole) of the formula (I) as set forth in claim 5 wherein the compound of the formula (I) is treated with a N-alkyl-2,7 difunctionalized carbazole of the formula (II)

with triphenylphosphine and 2,2'-bipyridine in the presence of zinc and nickel chloride to cause polymerization of the compound of the formula (II).

Chem. Abstract 131:88268 does not disclose the specific reactants employed or the reaction conditions necessary to synthesize the polymer disclosed therein that contains alternating carbazole and oxadiazole moieties.

Chem Abstract 119:181323 discloses that simultaneous gel-phase chromatography and cyclic voltammetry measurements are carried out in the course of the electrocatalyzed polymerization of 3,6-dibromo-N-alkylcarbazoles. The abstract does not teach or suggest the process of claim 5.

Chem. Abstract 114:31798 discloses that several poly(N-alkyl-3,6-carbazolediyl)s have been obtained by electroreduction of the corresponding dibromomonomers in the presence of a catalytic Ni (0)-based system. This abstract does not teach or suggest the process steps of claim 5.

Chem. Abstract 111:40172 discloses adding 3,6-dibromocarbazole to a suspension of NaH in DMF, stirring and treating dropwise with a solution of n-octyl bromide in DMF and stirring to produce N-n-octyl-3,6-dibromocarbazole; reluxing with dichloro(2,2'-bipyridyl)nickel in THF; adding the mixture to concentrated HCl, filtering, washing with water and drying. This abstract does not teach or suggest treating a N-alkyl-2,7-difunctionalized carbazole of the formula (II) with triphenylphosphine and 2,2'bipyridine in the presence of zinc and nickel chloride, to cause polymerization of the compound of the formula (II) as presently claimed.

Claim 6 depends from claim 5. For the reasons set forth above with respect to claim 5, claim 6 is not rendered obvious by the cited abstracts.

The Examiner is respectfully requested to withdraw the rejection of claims 5 and 6 under 35 U.S.C.§103(a) over the cited references.

CONCLUSION

In light of the above amendments and remarks, Applicants respectfully submit that all pending claims as currently presented are in condition for allowance. If, for any reason, the Examiner disagrees, please call the undersigned attorney at 202-736-8298 in an effort to resolve any matter still outstanding *before* issuing another action. The undersigned attorney is confident that any issue which might remain can readily be worked out by telephone.

Favorable reconsideration is respectfully requested.

Respectfully submitted,

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DWW:SES/alp

Attachments:

Geissler Article

Information Disclosure Statement